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ABSTRACT

A study examined the effect of headings and adjunct questions embedded in an expository test on the delayed multiple-choice test performance of 88 undergraduate students enrolled in psychology courses. The subject of the passage read by the students was the settling of Anglo America; the subheadings in the passage listed names of major subtopics serving to identify part-to-whole relationships within the passage. Subjects also completed an 18-question multiple-choice retention test that contained two explicit text-based questions for each of the major sections of the passage. The results indicated no specific facilitative effect of heading on the answering of multiple-choice questions about the information contained in the individual text segments preceded by the heading. In fact, in the case of detail retention test items, the inclusion of a heading for a text segment that was also followed by a question resulted in significantly poorer performance for some of the students. The results suggest that the appearance of any headings in the text may simply induce in subjects a strategy of trying to organize and interrelate the concepts in the text, and this strategy may then be applied to all sections of the passage regardless of whether they are preceded by a heading. (SRT)

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Multiple-choice Test Performance: Effects of Headings, Questions, Motivation, and Type of Retention Test Question

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Running head: MULTIPLE-CHOICE TEST PERFORMANCE

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Abstract

This experiment examined the effects of headings and adjunct questions embedded in expository text on the delayed multiple-choice test performance of college students. Both factors were manipulated as within-subjects factors, and their effectiveness was evaluated as a function of the subjects' motivation to study the passage thoroughly. The overall effect of heading-question condition was not significant, but there was a significant interaction of motivation group, heading-question condition, and type of retention test question, $p < .01$. For subjects who received low-motivation instructions, the number of detail retention test items answered correctly in the question-only condition exceeded significantly the number of detail retention test items answered correctly in both the heading-and-question condition and the neither-heading-nor-question condition. For subjects who received high-motivation instructions, the effect of heading-question condition was not significant in the answering of either detail or main-idea retention test questions. Thus, the results failed to find a specific facilitative effect of headings on recognition memory for those passage segments preceded by a heading, and the specific facilitative effect of questions was limited to detail information read under conditions that did not encourage high levels of commitment to the task.

Multiple-choice Test Performance: Effects of Headings, Questions, Motivation, and Type of Retention Test Question

This paper reports the results of an experiment designed to investigate the effects of headings in text, when used in conjunction with adjunct questions, on multiple-choice test performance. Recently, Wilhite (in press) examined this issue in light of suggestions by Nist and Hogrebe (1984, April) that the facilitative effect of headings on multiple-choice test performance may be less robust and reliable than the facilitative effect of adjunct questions. In his study, Wilhite found a significant facilitative effect of headings on the ability to answer multiple-choice questions, but having an adjunct question following a text segment did not have an overall positive effect on the ability to answer multiple-choice questions. There was no interaction of headings and adjunct questions. Thus, these results suggest that headings can positively affect multiple-choice test performance, in support of findings by Brooks, Dansereau, Spurlin, and Holley (1983, exp. 1), and they fail to support the suggestion that the effect of headings is less robust than that of adjunct questions.

However, in both the experiment by Wilhite and in the experiment by Brooks et al. (1983, exp. 1), the presence of headings was manipulated as a between-subjects factor. Thus, it is not possible to determine whether the headings were

exerting a specific effect on the processing of individual text segments or were instead simply inducing a general processing strategy that influenced all segments of the text. In order to address this issue, the factor of headings was manipulated as a within-subjects factor in the present study. If, in fact, headings do exert a specific effect on the processing of individual text segments, then subjects should be better able to answer multiple-choice retention test questions about passage segments preceded by a heading than they are to answer multiple-choice retention test questions about passage segments not preceded by a heading.

The effect of adjunct questions was also included in this study as a within-subjects factor, as it was in the experiment by Wilhite (in press), in an attempt to determine why Wilhite failed to find a significant overall facilitative effect of adjunct questions on memory for related passage information not specifically quizzed by the adjunct question (an effect referred to as the indirect effect of adjunct questions). It is possible that the presence of adjunct questions after some of the text segments induced a general processing strategy that was applied to text segments not quizzed by an adjunct question as well as to those quizzed by an adjunct question. However, this explanation is not completely convincing as Wilhite (1982, 1983, 1984, 1985) has in other experiments involving adjunct questions as a

within-subjects factor found a significant positive effect of adjunct questions that was limited to memory for information from the segment of the text specifically quizzed by the adjunct question. Another possible reason that Wilhite failed to find a significant overall effect of adjunct questions was because his subjects, unlike those in other adjunct question studies, received instructions intended to produce high levels of commitment to the task. Thus, it is possible that the adjunct question manipulation was not significant because subjects were highly motivated to process extensively all segments of the text, regardless of whether they were quizzed by an adjunct question. To test this possibility, half of the subjects in the present experiment received instructions that stressed that performance on the multiple-choice retention test would determine the number of bonus points earned for participating in the experiment, whereas the other half of the subjects were told that performance on the multiple-choice retention test would not affect the number of bonus points earned.

A third factor included in this study was the learner's locus of control. In Wilhite's (in press) experiment, a significant interaction of locus of control group and adjunct questions was reported. For subjects with an internal locus of control, performance in the questions-present condition exceeded significantly performance in the questions-absent

condition; however, adjunct questions did not significantly affect the performance of subjects with an external locus of control. These results were interpreted as suggesting that adjunct questions may induce a very general review of the relevant passage material by readers with an internal locus of control and that this review may facilitate retention of unquizzed as well as quizzed information from that passage segment. Conversely, the externals showed no evidence of having studied more extensively the passage sections followed by a question. Thus, it was of interest to determine if this effect of locus of control could be replicated in a situation in which both headings and questions were manipulated as within-subjects factors. It was also desirable to investigate the possible relationship between motivation and locus of control in regard to the effects of headings and questions on multiple-choice test performance. That is, the present study was an attempt to assess the reliability of the previously reported relationship between locus of control and adjunct questions and to determine whether any differential effect of adjunct questions on internals and externals would be mediated by the subjects' motivation to process the material thoroughly. It is possible, for example, that Wilhite (in press) failed to find a significant effect of questions for externals because they processed the passage under instructions designed to encourage a high level of

commitment to the task and, as a result, failed to use the questions as a basis for discriminating between potentially relevant and irrelevant passage information.

A final factor included in the present study was the hierarchical importance of the information quizzed by the retention test question. In earlier studies by Wilhite (1982, 1985) that did not include the factor of headings, postpassage adjunct questions (i.e., questions appearing after the segment of the passage containing the answer to the question) facilitated high-level indirect recall but not low-level indirect recall, but in the study (Wilhite, 1986) in which the factor of headings was included the facilitative effect of the adjunct questions for internals was not limited to main-idea information. However, this difference in the effect of hierarchical importance in the various experiments cannot be attributed simply to the inclusion of headings in the more recent study because there was also no evidence of an interaction of hierarchical importance of the retention test question and question condition in the no-headings group of that study. Thus, the fact that subjects in the more recent experiment by Wilhite received instructions designed to promote high levels of commitment to the task, whereas subjects in the earlier experiments did not, is of interest in any attempt to reconcile the results of the various studies. Perhaps adjunct questions induce a general

memory-facilitating review process that includes processing of both high-level and low-level information in readers with an internal locus of control but only when they are highly motivated to process the text extensively. Under conditions of lower motivation, any memory-facilitating review process induced by the questions may be limited to the more readily accessible high-level, superordinate information in the passage.

In summary, this experiment was designed to address the following questions:

1) Will headings facilitate delayed multiple-choice test performance in a situation in which they are used in conjunction with adjunct questions and in which they are manipulated as a within-subjects factor?

2) Will adjunct questions have an overall indirect facilitative effect on multiple-choice test performance only for subjects who read the passage after receiving instructions designed to produce lower levels of commitment to the task?

3) Will adjunct questions have an indirect facilitative effect on multiple-choice test performance for subjects with an internal locus of control but not for subjects with an external locus of control, and will any differential effect of adjunct questions for internals and externals be mediated by instructions designed to influence the subjects'

motivation to process the text extensively?

4) Will adjunct questions have an indirect facilitative effect on low-level as well as high-level retention test items, and will the influence of adjunct questions on the two types of retention test items be affected by the motivation instructions the subjects receive?

Method

Subjects and Setting

Eighty-eight students enrolled in psychology courses at Widener University participated as subjects for course credit. All testing took place in regular university classroom during morning and afternoon hours.

Materials

The passage used was that employed by Wilhite (in press), a 2,136-word chapter, entitled "Anglo-America: Early Differences, Experiences, and Technologic Changes", from the American government textbook, Government by the People (Burns, Peltason, & Cronin, 1980). The chapter was divided into 10 sections in the actual text by the inclusion of embedded headings which consisted of a word or short phrase describing one of the main topics in the following material. That is, the headings appearing in the passage represented a listing of the names of the major subtopics discussed in connection with the settling of Anglo-America. Thus, the headings served to identify part-to-whole relationships

within the passage as opposed to signalling the type of text structure relationship, such as comparison/contrast, existing between the various sections of the passage (see Meyer, 1975). These headings, in the order in which they appeared in the text, were: Early Settlement, Transfer of European Ideas, Early Economic Orientation, French Interests, New England, The Southern Colonies, The Middle Colonies, The Lower St. Lawrence, and The Southern Appalachians. The adjunct questions used were the same as those employed by Wilhite (in press). For all of the passage segments except the first, a text-based adjunct question quizzing one of the main ideas in the section was used. The following is one of the passage segments with its associated heading and adjunct question:

Transfer of European Ideas

Initial settling coincided with a time when expansionism was a motivating force in Europe. The colonies were a product of that mood. Social, political, and economic conditions in Europe were favorable to migration and colonization. European ideas regarding greater equality before the law were transferred to the colonies, where along with the mutual effort required for survival, they promoted egalitarian notions. Commercialism, long an acceptable activity and source of profit in Europe, found fertile ground in the

colonies. That companies sponsoring settlements sought a profit as private enterprises was indicative of the heritage immediately transferred to this part of the New World.

Why did the colonization of Anglo-America take place?[1]

Eight of the 10 passage segments were selected as the experimental segments. The first segment of the passage was excluded as an experimental segment because no heading, apart from the title itself, preceded this section in the actual text and because the information in this section was very general. No adjunct question was generated for this segment of the passage. In order to have an equal number of passage sections that were and were not preceded by a heading and that were and were not followed by a question, section 8 of the passage (concerning the Middle Colonies) was selected, as it was in Wilhite's (in press) study, as the other non-experimental segment. In all versions of the passage, this section was preceded by its associated heading and was followed by its associated adjunct question.

Four versions of the passage were generated. First, one version was generated by randomly assigning two of the experimental passage segments to each of the four

heading-question conditions. Thus, two of the experimental passage segments were presented with both a heading and a question present, two were presented with only a heading present, two were presented with only a question present, and two were presented with neither a heading nor a question present. Three additional version of the passage were then generated such that across the four versions of the passage each experimental passage segment appeared in each of the heading-question conditions, with the restriction that within each version of the passage each heading-question condition was represented by two of the experimental passage segments.[2]

The 18-question multiple-choice retention test employed in the Wilhite (in press) study was also used in this experiment. The test contained two explicit text-based questions for each of the major sections of the passage except the first. One of the questions from each segment of the passage quizzed a main idea, and the other quizzed detail information. For example, for the passage section presented above, the main idea question read:

Which of the following was a motivating force in the initial settling of Anglo-America?

a. political conditions in Europe
b. climate in Europe
c. expansionism
d. a and c only

and the detail question read:

> Which of the following European ideas was not transferred to New World colonies?
>
> a. rule by the wealthy
>
> b. more equality for the people
>
> c. private enterprise
>
> d. cooperation for survival[3]

As described by Wilhite (in press), the distinction between main-idea and detail information in constructing the retention test was made intuitively by the experimenter, but the judgements of the experimenter were confirmed by three members of the faculty of the social science division who were naive to the purposes of the research. Each of the faculty members read each segment of the passage and then judged which of the two retention test questions generated for that segment quizzed main idea information and which quizzed detail information. The judgements of two of the faculty members were consistent with those of the experimenter for all nine segments considered, and the judgements of the third faculty member were consistent with those of the experimenter for eight of the nine segments considered.

None of the adjunct questions embedded in the passage were repeated in the multiple-choice retention test. The 18 questions appeared on three separate pages of the test

booklet with the pages appearing in all six possible orders in different booklets.

Procedure and Design

The subjects participated in two sessions one week apart and were tested either individually or in groups ranging in size from two to 12. The experimental sessions were randomly assigned to either the high-motivation group or the low-motivation group, with the restriction that the two groups contained equal numbers of subjects. In the first session, subjects in both groups read the passage after receiving instructions to study the passage in preparation for a multiple-choice exam to be given during the second experimental session. The subjects were specifically instructed to use both the questions and the headings in the text to help them prepare for the multiple-choice exam on the passage. The subjects were told to use the questions in the text by writing an answer for each one, and they were encouraged to look back in the text for the answer to the question. They were told to use each heading in the text to anticipate the information that was to be presented in the following passage segment, and they were told to try to determine why each heading was appropriate for the passage segment it preceded.

The 44 subjects in the high-motivation group were told prior to the reading of the passage that their level of

performance on the multiple-choice retention test would determine the number of bonus points to be applied to their course grade as a result of their participation in the experiment. This instruction was designed to motivate the subjects to study the passage thoroughly and extensively. The 44 subjects in the low-motivation group were told prior to the reading of the passsage that their level of performance on the multiple-choice retention test would not influence the number of bonus points they earned for participating in the experiment. They were told that as long as they completed both sessions of the experiment on the dates agreed they would receive the maximum number of bonus points available for participation, but they were asked to prepare for the retention test to the best of their ability.

Subjects in both groups were told that they could read and study the passage at their own speed, that they could mark or underline the passage as they liked, and that they were free to re-read the passage, but they were asked not to spend more than an hour in reading and studying the passage. They were told to return their booklets to the experimenter once they felt they were adequately prepared for the test to be given on the passage in the second session a week later. Within each of the two groups, each of the four different versions of the passage was read by 11 subjects.

In the second experimental session, subjects completed

one-half of the Wide Range Vocabulary Test (French, Ekstrom, & Price, 1963) and the Adult Nowicki-Strickland Internal-External Control Scale (Nowicki & Duke, 1974) before receiving the multiple-choice test on the passage. The vocabulary test was timed, but the subjects were free to complete the other two measures at their own speed. No subject took more than 30 minutes to complete the second session of the experiment. Approximately six weeks after the completion of the experiment, subjects were debriefed during their regular psychology class meeting.

A split-plot design was employed with two between-subjects factors, two within-subjects factors, and one covariate. One of the between-subjects factors was that of locus of control. Those subjects scoring below the median score of 8, out of a total possible of 32, constituted the group of internals, and those subjects scoring above the median constituted the group of externals. The other between-subjects factor was that of motivation. The median-split on locus of control scores resulted in 22 of the 44 high-motivation subjects being classified as internals and 22 being classified as externals; likewise, of the 44 subjects in the low-motivation group, 22 were classified as internals and 22 were classified as externals.

One of the within-subjects factors was that of heading-question condition (heading-and-question,

heading-only, question-only, and neither-heading-nor-question). The heading-and-question condition referred to those two passage sections that were both preceded by a heading and followed by an adjunct question. The heading-only condition referred to those two passage sections that were preceded by a heading but were not followed by an adjunct question. The question-only condition referred to those two passage sections that were followed by an adjunct question but were not preceded by a heading. The neither-heading-nor-question condition referred to those two passage sections that were neither preceded by a heading nor followed by a question. Note that the two retention test questions quizzing information from Section 8 of the passage were not included in the analysis.

The other within-subjects factor was that of type of retention-test question (main idea questions and detail questions). Thus, the dependent measure was the number of multiple-choice retention test question of each type (main-idea and detail) answered correctly for those two experimental passage sections representing each of the four heading-question conditions. The covariate in the analysis was the score on the measure of vocabulary knowledge, with each subject's score determined by subtracting one-fifth of the number answered incorrectly from the total number answered correctly. The subtraction was made as a correction

for guessing, based on five answer alternatives per item.

Results

The internal consistency of the multiple-choice retention test was assessed by the calculation of an alpha coefficient. The obtained coefficient of internal consistency was .62.

In the analysis of covariance, the assumption of homogeneity of within-group regression coefficients was found to be tenable, as the test for the violation of homogeneity of regression was not significant, $F(31, 80) < 1$. Table 1 summarizes the results of the analysis of covariance. All significant effects reported below from the analysis are based on a rejection level of $p < .05$.

Insert Table 1 about here.

The analysis revealed a significant main effect of the between-subjects factor of locus of control group. Subjects with an internal locus of control significantly outperformed subjects with an external locus of control, with means of .90 and .76, respectively. The other between-subjects factor of motivation group and the two-way interaction of locus of control group and motivation group were not significant.

Table 1 also shows that the within-subjects factor of heading-question condition was not significant, but the

within-subjects factor of type of retention test question was significant. Main-idea retention test questions were answered significantly better than detail retention test questions, with means of 1.13 and .54, respectively.

The only other significant effect was the three-way interaction of motivation group, heading-question condition, and type of retention test question. The means from this interaction are shown in Table 2. Tests of simple interactive effects showed the effect of heading-question condition to be significant for the low-motivation group in the answering of detail retention test questions, $F(3, 252) = 4.43$, $p < .01$. By Tukey's test, subjects in the low-motivation group answered significantly more detail questions in the question-only condition than they did in either the heading-and-question condition or the neither-heading-nor-question condition. None of the other differences between heading-question conditions were significant for the low-motivation group in the answering of detail retention test questions. Other tests of simple interactive effects showed the effect of heading-question condition was not significant for the low-motivation group in answering main-idea retention test questions, $F(3, 252) = 1.88$, $p < .25$. In addition, the effect of heading-question condition was not significant for the high-motivation group for either main-idea or detail retention test items, with

$F(3, 252) = 1.88$, $p < .25$, and $F(3, 252) < 1$, respectively.

Insert Table 2 about here.

To rule out the possibility that a ceiling effect contributed to the failure to find a significant effect of headings in the answering of main-idea questions by the low-motivation subjects, a further split-plot analysis of covariance was performed. The main-idea retention test data from six low-motivation subjects from each of the four subgroups (corresponding to the four different versions of the passage) were included in the analysis. The six subjects selected from each subgroup were those with the lowest scores on the main-idea retention test questions, collapsed across heading-question conditions. In the analysis, the covariate was vocabulary test score, the between-subjects factor was locus of control group, and the within-subjects factor was heading-question condition. The effect of heading-question condition was not significant, $F(3, 66) = 1.93$, $p < .14$, with means, corrected for the effect of the covariate, of 1.19 ($SD = .72$), .89 ($SD = .80$), .70 ($SD = .70$), and .78 ($SD = .72$), for the heading-and-question, heading-only, question-only, and neither-heading-nor-question conditions, respectively.

Discussion

This experiment failed to demonstrate a specific facilitative effect of headings on the answering of multiple-choice questions about the information contained in the individual text segments preceded by the headings. In fact, in the case of detail retention test items, the inclusion of a heading for a text segment that was also followed by a question resulted in significantly poorer performance for subjects in the the low-motivation group than that found for text segments that were followed by a question and were not preceded by a heading. Thus, given findings by Wilhite (in press) and Brooks et al. (1983, exp. 1) that showed a facilitative effect of headings on multiple-choice test performance when the headings were manipulated as a between-subjects factor, the results of this experiment suggest that the effects of headings on recognition memory may be very general in nature. That is, the appearance of any headings in the text may simply induce in subjects a strategy of trying to organize and interrelate the concepts in the text, and this strategy may then be applied to all sections of the passage regardless of whether they are preceded by a heading. If this suggestion is correct, then the use of headings may not be an effective means of differentially emphasizing certain sections of a passage in a situation in which memory is to be assessed by a recognition

test. The fact that combining a heading with a question depressed performance on detail retention test questions relative to the question-only condition for the low-motivation group suggests that whatever specific effect headings may have on the passage segments they precede it does not reinforce the specific effect of text-based adjunct questions.

However, two features of the present experiment suggest that further experimentation is needed before headings are dismissed as ineffective in producing selective facilitation of recognition memory for information from the passage segments that they precede. First of all, the reliability of the retention test, as assessed by the measure of internal consistency, was not as high as is desirable. Secondly, the retention test contained only two questions for each combination of heading-question condition and type of retention test question. The pattern of results for the low-motivation group in the answering of main-idea retention test questions, although not significant even for the lowest scoring subjects, at least suggests that the issue of a specific facilitative effect of headings on main-idea multiple-choice retention test items is worth further investigation in a situation in which a larger number of observations per subject are possible.

The finding that the only significant effect of the

adjunct questions was in the answering of detail questions by subjects in the low-motivation group provides some support for the suggestion that encouraging high levels of commitment to the task by subjects in Wilhite's (in press) experiment may have contributed to the failure to find an overall facilitative effect of adjunct questions. Thus, these results are consistent with Andre's (1979) argument that processing aids such as adjunct questions are most likely to influence memory significantly when the reader is not likely in the absence of such aids to devote maximum processing effort to the material.

However, the lack of a facilitative effect of the questions in the answering of main-idea questions by subjects in the low-motivation group shows that the questions were exerting a very specific effect on the reprocessing of the passage information. Perhaps in answering the adjunct questions in a situation in which lookbacks were encouraged the subjects spent very little time reprocessing high-level information that was more readily available in memory and instead concentrated on reviewing low-level information of possible relevance to the question. Thus, the fact that lookbacks were permitted in this study and in Wilhite's (in press) study could be an additional factor that contributed to the failure of these studies to find an indirect effect of questions on main-idea information in the passage segment.

In the earlier studies by Wilhite (1982, 1985) in which the indirect effect of adjunct questions was limited to high-level information, lookbacks in answering the questions were not allowed. Therefore, these studies by Wilhite support the arguments of Andre (1979) and Duchastel and Nungester (1984) that the issue of lookbacks with regard to the indirect effect of adjunct questions is worthy of further investigation.

There was no evidence in this study of an interaction of locus of control and heading-question condition, as might have been expected on the basis of Wilhite's (in press) findings. In particular, the adjunct question effect described above was not more pronounced for the subjects with an internal locus of control than it was for the subjects with an external locus of control, as was the case in Wilhite's (in press) study. This difference in results cannot be attributed to differences in the distribution of locus of control scores in the two studies. In both experiments, the median locus of control score was 8, and the mean locus of control scores were 8.33, $\underline{SD}$ = 4.24, and 8.50, $\underline{SD}$ = 4.68, for the present experiment and the earlier experiment, respectively. Therefore, it is questionable whether it will be possible to predict the effectiveness of adjunct questions on the basis of the reader's locus of control, and the lack of a consistent relationship between

locus of control and heading-question condition in the two studies again demonstrates the difficulty of replicating aptitude by treatment interactions. The study did reveal that internals overall performed significantly better than externals. This finding is consistent with Lefcourt's (1982, chap. 5) suggestion that internals are likely to be superior to externals at assimilating new information relevant to the primary task goal. However, to the extent that Lefcourt is correct in arguing that the superiority of internals is limited to new information perceived to be relevant to the primary task, the lack of an interaction of locus of control and heading-question condition may suggest that the internals in the present experiment were not using the headings and questions as a means of selecting for additional processing passage information likely to be tested on the multiple-choice retention test. Thus, the lack of an interaction of locus of control group and heading-question condition may be further evidence of the limited usefulness of headings and questions in differentially emphasizing entire sections of a passage.

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Author Notes

Requests for reprints and copies of the experimental materials should be sent to Stephen C. Wilhite, Widener University, Social Science Division, Chester, PA 19013.

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Footnotes

[1]Another example passage segment is presented in Wilhite (in press).

[2]The four versions of the passage used in the experiment can be obtained from the author on request.

[3]The multiple-choice retention test used in the experiment can be obtained from the author on request.

Table 1

Summary of Analysis of Covariance

Source	SS[a]	DF	MS	F	p
Between-subject					
Motivation group (A)	.97	1	.97	1.58	.210
Locus of control group (B)	3.48	1	3.48	5.65	.019
A x B	.76	1	.76	1.24	.269
Error	51.14	83	.62		
Within-subject					
Heading-question condition (C)	.39	3	.13	.24	
A x C	1.45	3	.48	.87	
B x C	.72	3	.24	.43	
A x B x C	.36	3	.12	.21	
Error	139.71	252	.55		
Retention test question (D)	62.05	1	62.05	145.81	<.001
A x D	.04	1	.04	.08	
B x D	.51	1	.51	1.21	.275
A x B x D	.04	1	.04	.08	
Error	35.74	84	.43		
C x D	1.82	3	.61	1.88	.132
A x C x D	3.90	3	1.30	4.03	.008
B x C x D	1.08	3	.36	1.12	.342
A x B x C x D	.90	3	.30	.93	
Error	81.41	252	.32		

[a]The sums of squares shown were adjusted for the effect of the covariate, vocabulary test score.

Table 2

Mean Number of Multiple-choice Questions Answered Correctly

Retention test question	Heading-question condition			
	Heading-and-question	Heading-only	Question-only	Neither
High motivation group				
Main-idea				
M	1.19	1.05	1.26	1.19
SD	.67	.75	.61	.66
Detail				
M	.58	.51	.53	.64
SD	.68	.71	.70	.59
Combined	.89	.78	.90	.92
Low motivation group				
Main-idea				
M	1.22	1.13	.95	1.04
SD	.67	.73	.70	.74
Detail				
M	.33	.54	.74	.40
SD	.65	.70	.71	.63
Combined	.78	.84	.85	.72

Note. The maximum possible score was 2.00. The means shown were adjusted for the effect of the covariate, vocabulary test score.